



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,670	05/19/2006	Peter Schwarzler	GKNG 1278 PCT	2727
27256	7590	12/10/2008	EXAMINER	
Dickinson Wright PLLC 38525 Woodward Avenue Suite 2000 Bloomfield Hills, MI 48304			LOUDEN, CLIFFORD J	
			ART UNIT	PAPER NUMBER
			3679	
			MAIL DATE	DELIVERY MODE
			12/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/568,670	Applicant(s) SCHWARZLER ET AL.	
	Examiner CLIFFORD J. LOUDEN	Art Unit 3679	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 14-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 14-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2008 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :02/16/2006, 05/26/2006, 10/28/2008.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "ES1 & ES2" and "PS1 & PS2" have both been used to designate the straight lines of claims 15, L3 & 33, L4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The title of the invention is objected to because the title on page 1 of the specification does not match the title of the declaration for utility or design patent application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 3679

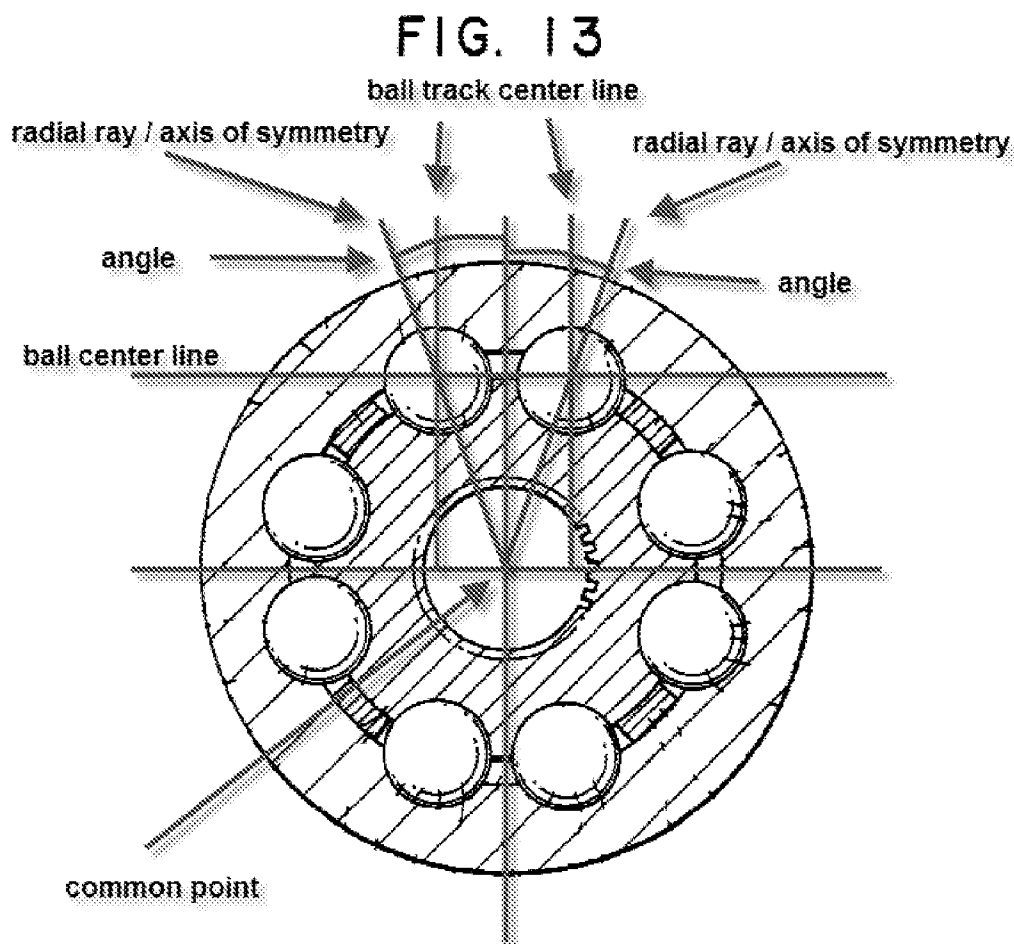
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 14-15, 19-21 & 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Ouchi et al., US 2001/0021671 (Ouchi). As to claim 1, Ouchi shows in Fig. 13 a constant velocity fixed joint (301d) comprising: an outer joint part (303B) having a longitudinal axis (directed into the figure), and an attaching end and an aperture end positioned axially opposite one another (inherent to constant velocity joints and exemplified in Fig. 5), and outer ball tracks (308); an inner joint part (302A) having a longitudinal axis (directed into the figure), an attaching mechanism for a shaft pointing towards the aperture end of the outer joint part (inherent to constant velocity joints and exemplified in Fig. 5), and inner ball tracks (307), the outer ball tracks and the inner ball tracks form pairs of tracks which each accommodate a torque transmitting ball, wherein each two adjoining pairs of tracks comprise outer ball tracks whose center lines are positioned in planes (shown in the examiner marked diagram below and labeled as “ball track center line”) which extend substantially parallel relative to one another, and inner ball tracks whose center lines are positioned in planes (shown in the examiner marked diagram below and labeled as “ball track center line”) which extend substantially parallel relative to one another; and an annular ball cage (309d) between the outer joint part and the inner joint part and comprising circumferentially distributed cage windows which each accommodate the torque transmitting balls of two of said adjoining pairs of tracks; wherein, in an aligned joint, centers (shown in the examiner marked diagram below and labeled as “ball center line”) of the balls are held by the ball cage in the joint center plane (inherent to constant velocity joints and exemplified in Fig. 6) and, when the joint is articulated, the ball centers are guided onto the

Art Unit: 3679

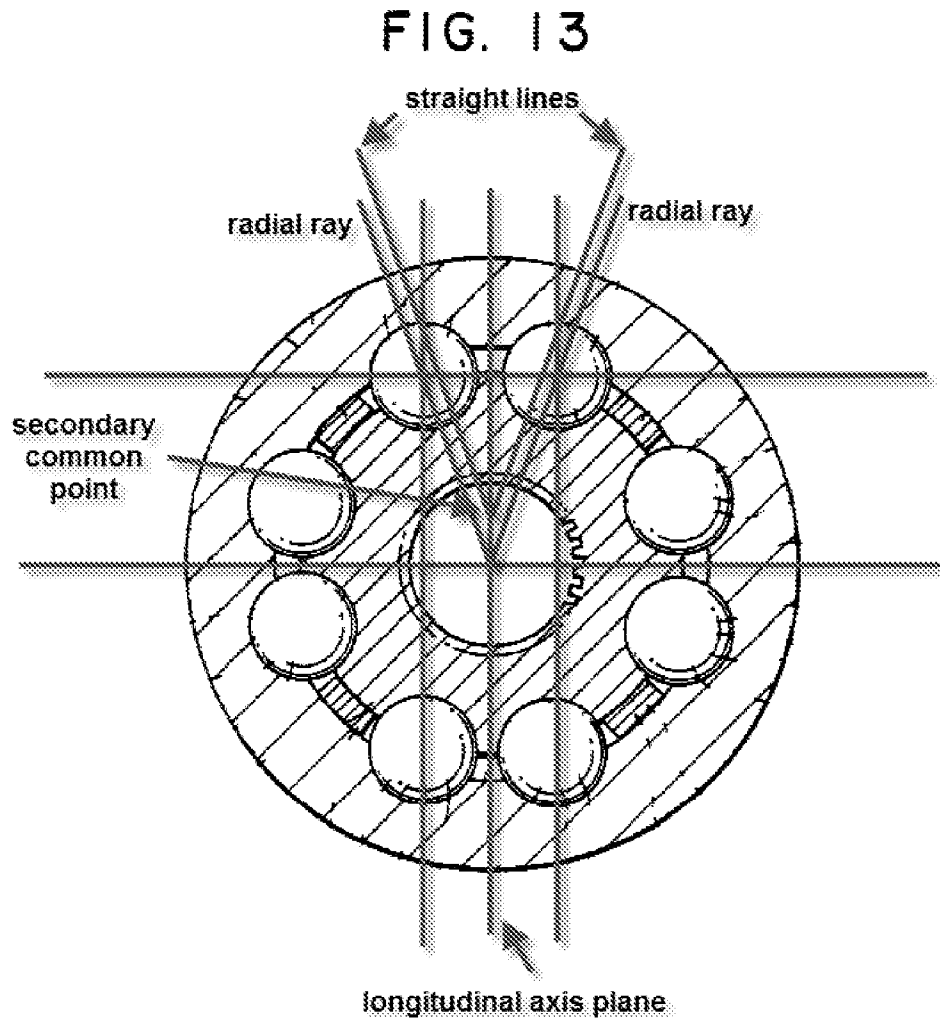
angle-bisecting plane (exemplified by Fig. 21) between the longitudinal axes, and wherein track cross-sections of the outer ball tracks and the inner ball tracks of each pair of tracks are symmetrical relative to axes of symmetry (shown in the examiner marked diagram below and labeled as “radial ray/axis of symmetry”) which, together with the outer and inner ball track planes, form identically sized angles (shown in the examiner marked diagram below and labeled as “angle”) opening in opposite directions, and each comprise a common point (shown in the examiner marked diagram below and labeled as “common point”).



Art Unit: 3679

Claim 14: Ouchi shows the track cross-sections of the outer ball tracks and of the inner ball tracks of each pair of tracks are each symmetrical relative to radial rays (shown in the examiner marked diagram above and labeled as “radial ray/axis of symmetry”) from the longitudinal axes through the ball centers of the torque transmitting balls of the pair of tracks.

Claim 15: Ouchi shows the track cross-sections of the outer ball tracks and of the inner ball tracks of each pair of tracks are each symmetrical (about a line, running through the ball centers and perpendicular to the straight lines) relative to straight lines (shown in the examiner marked diagram below and labeled as “straight lines”) which are positioned in a cross-sectional plane and which extend parallel to radial rays (shown in the examiner marked diagram below and labeled as “radial ray”) from the longitudinal axes through the ball centers of the torque transmitting balls of the pair of tracks and which intersect one another in a common point (shown in the examiner marked diagram below and labeled as “secondary common point”) at a distance from the longitudinal axes.



Claims 19-21: Ouchi shows the track center lines of the outer ball tracks and of the inner ball tracks are positioned in planes (shown in the first examiner marked diagram above and labeled as “ball track center line”) which extend parallel relative to one another and parallel relative to the longitudinal axes of the joint and which extend through the ball centers of the balls of two of said adjoining pairs of tracks.

Art Unit: 3679

Claim 29: Ouchi shows in Figs. 5-9 an opening angle between tangents at the base lines of two of said adjoining pairs of tracks in an aligned joint in the joint center plane each open in the same direction.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 16-18, 22-28 & 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al., US 2001/0021671 (Ouchi).

As to claims 16-18, Ouchi does not expressly disclose the angles (ϕ_1 , ϕ_2) range from $0.8\phi_0$ to $1.3\phi_0$, wherein $2\phi_0$ constitutes a center angle in an aligned joint between radial rays from the longitudinal axes through the ball centers (K1, K2) of the balls of two of said adjoining pairs of tracks. However, it would have been obvious to one of ordinary skill in the art through engineering design and optimization to determine a suitable range of angles of which $0.8\phi_0$ to $1.3\phi_0$ may be included. These angles would inherently include a median value to serve as the center angle as claimed.

Claim 22: the limitations of this claim are addressed above.

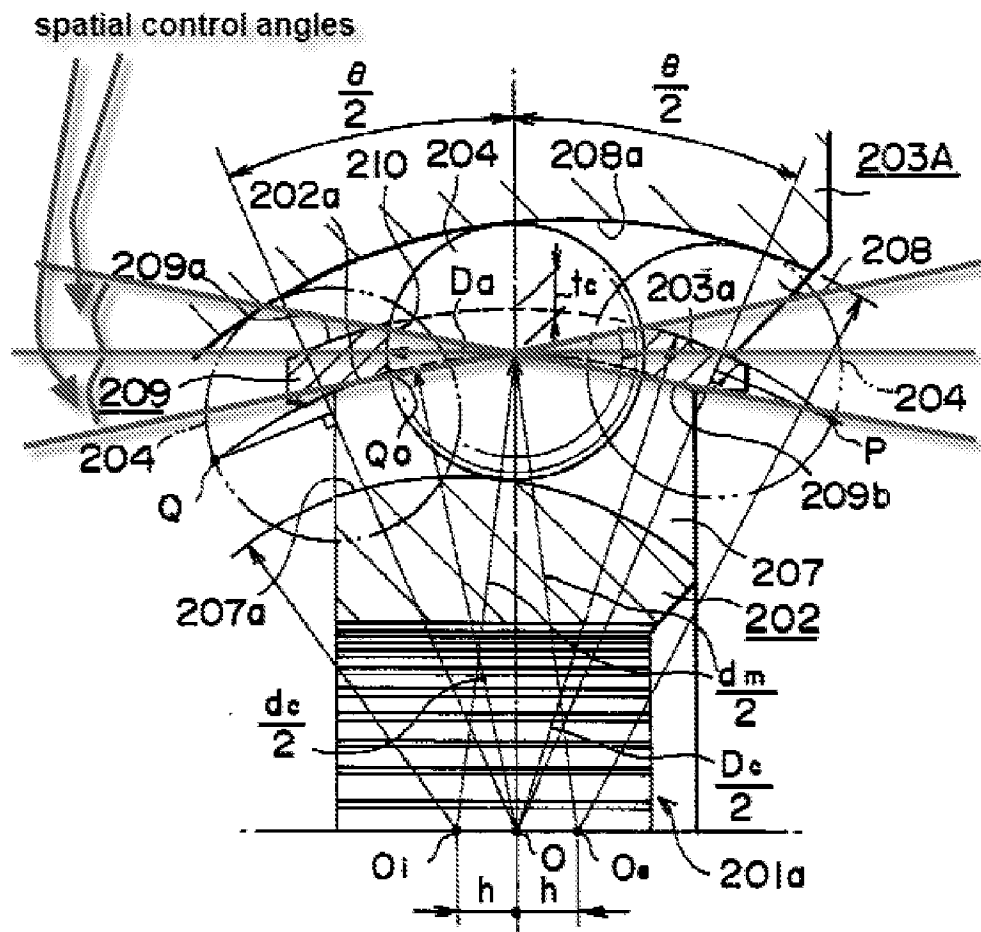
As to claims 23-26, Ouchi does not expressly show the track center lines of the outer ball tracks extend in first planes and center lines of the inner ball tracks extend in second planes

Art Unit: 3679

which are parallel relative to one another and extend through the ball centers of the balls of two of said adjoining pairs of tracks and which are at identical perpendicular distances from the joint center, and wherein, together with the longitudinal axes, they form identically sized angles of intersection extending in opposite directions. It appears that if the device of Fig. 13 were rotated from the top out of the page by 90 degrees it would show the track center lines of the outer ball tracks extend in first planes (shown in the first examiner marked diagram above and labeled as "ball track center line") and center lines of the inner ball tracks extend in second planes (coincident with the outer ball tracks) which are parallel relative to one another and extend through the ball centers of the balls of two of said adjoining pairs of tracks and which are at identical perpendicular distances from the joint center, and wherein, together with the longitudinal axes, they form identically sized angles of intersection (in this case 0 degrees) extending in opposite directions.

As to claim 27, Ouchi does not expressly disclose the angles of intersection (γ_0, γ_0') are selected in such a way that spatial control angles (ϵ_0, ϵ_0') of the pairs of tracks at the balls have the same value irrespective of whether the load turns clockwise or anti-clockwise. However, it appears that the angles of intersection selected (i.e. 0 degrees) were selected in such a way that the spatial control angles (as exemplified in the examiner marked diagram below and labeled as "spatial control angles") of the pairs of tracks at the balls have the same value irrespective of whether the load turns clockwise or anti-clockwise.

FIG. 6



As to claim 28, Ouchi shows a center angle $2\phi_0$ (being the summation of the angles formed between the radial rays) between radial rays (as described above) through the ball centers of the balls of two of said adjoining pairs of tracks. Ouchi does not expressly disclose the angle of intersection (γ_0) is calculated in accordance with the equation $\gamma_0 = \varepsilon_0 \times \tan\phi_0$. However, it would have been obvious to one of ordinary skill in the art through engineering design and

Art Unit: 3679

optimization to determine a suitable range of angles of intersection which may be determined via the equation $\gamma_0 = \varepsilon_0 \times \tan \phi_0$.

Claim 32: Ouchi shows in Figs. 19A-20B the track cross-sections of the outer ball tracks and of the inner ball tracks are formed by parabolic or ellipsoidal portions or by gothic arches which each generate contact with the balls in two points in order to prevent the edge load from occurring on the rolling surface of each ball improving the exfoliation life-span (§ [0207]). At the time of the invention, it would have been obvious to modify the ball tracks as shown by Ouchi to prevent the edge load from occurring on the rolling surface of each ball improving the exfoliation life-span.

7. Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al., US 2001/0021671 (Ouchi) as applied to claims 1 & 14-29 above, and further in view of Jacob, US 6,270,419. As to claim 30, Ouchi does not expressly disclose an opening angle (α_1, α_1) between tangents at the track base lines in the joint center plane (EM) of two of said adjoining pairs of tracks in an aligned joint open in opposite directions. Jacob shows in Figs. 1 & 7 an opening angle between tangents at the track base lines in the joint center plane of two of said adjoining pairs of tracks in an aligned joint open in opposite directions in order to achieve advantageous centering conditions and improve service life (Col. 2, L54-63). At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the track grooves of Ouchi to extend in opposite directions as taught by Jacob to improve centering conditions and service life.

Art Unit: 3679

Claim 31: Ouchi shows in Fig. 13 the balls of two of said adjoining pairs of tracks in an aligned joint are positioned on different pitch circle radii.

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al., US 2001/0021671 (Ouchi) in view of Jacob, US 6,270,419, as applied to claims 1-32 above, and further in view of Krude, US 4,019,347. As to claim 33: Ouchi does not expressly disclose track cross-sections of the outer ball tracks and inner ball tracks are formed by circular portions whose centers of curvature are positioned at a distance from one another on a respective radial ray (RS1, RS2) and, respectively, on a straight line (PS1, PS2) extending parallel thereto, and wherein their radius of curvature is greater than the ball radius, and which circular portions generate contact with the balls in one point.

Krude teaches in Fig. 3 track cross-sections of the outer ball tracks and inner ball tracks are formed by circular portions whose centers of curvature are positioned at a distance from one another on a respective radial ray and, respectively, on a straight line extending parallel thereto, and wherein their radius of curvature is greater than the ball radius, and which circular portions generate contact with the balls in one point (Col. 2, L59-65) in order to obtain a longer and reliable operating life (Col. 4, L1-15). At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the ball tracks of Ouchi and Jacob as taught by Krude to improve the device with a longer and reliable operating life.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kobayashi et al. (US20030017877) discloses a constant velocity universal joint. Thomas (US20030054893) discloses a constant velocity joint. Aucktor (US3475924) discloses a universal joint. Winkler (US4432741) discloses a joint means for transmitting a moment of rotation in both directions. Jacob (US5221233) discloses a constant velocity fixed joint with alternative sequential running grooves. Kozlowski (US5643091) discloses a stroking constant velocity joint having low stroke load. Krude (US6071195) discloses a constant velocity universal ball joint.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CLIFFORD J. LOUDEN whose telephone number is (571)270-5504. The examiner can normally be reached on Monday through Thursday, 8:00AM to 4:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on (571)272-7087. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3679

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Greg Binda/
Primary Examiner, Art Unit 3679

/CLIFFORD J LOUDEN/
Examiner, Art Unit 3679
December 2, 2008